

Paddlefish Left and

By Jon Firehammer, Dennis Scarnecchia and Fred Ryckman

Every year on May 1, anglers from North Dakota and beyond converge at the confluence of the Missouri and Yellowstone rivers southwest of Williston for a chance to snag North Dakota's largest and most distinctive fish, the paddlefish. From their feeding grounds in Lake Sakakawea, these ancient, zooplankton-eating fish navigate up the Missouri in preparation for spawning. As they approach the Confluence of these two major rivers, they are faced with the dilemma faced by the Lewis and Clark Expedition – which way to go: left, up the Yellowstone, or right, up the Missouri?

The Yellowstone, which today is the less altered of the two rivers, has no large mainstem dams, a natural runoff pattern and temperature regime, and high levels of suspended sediment. During high spring flows, the water often looks like coffee with cream. The Missouri, in contrast, has had its runoff pattern, temperature, and suspended sediment levels altered by the construction of Fort Peck Dam in the 1930s. Today, the Missouri is colder, clearer, and more regulated than the free-flowing Yellowstone. It is perhaps not surprising that paddlefish passing the

Confluence often seem to prefer the Yellowstone rather than the Missouri as they migrate upriver to spawn. Concentrations of paddlefish moving up the Yellowstone have resulted in additional popular fishing sites at Sundheim Park, the State Line, and farther upriver at Intake, Montana.

Anglers have long known that migrating paddlefish tend to move upriver with rising flows. It is also known from tagging studies in the 1960s and 1970s that adult fish tagged in the Yellowstone at Intake have been caught in later years in the Missouri Dredge Cuts below Fort Peck Dam, and vice versa.

Other than information the snagging fisheries have provided, however, much is still unknown about the patterns and rates of paddlefish movements. Although year-round movement information is needed, one of the most important issues is to determine the precise signals paddlefish use when selecting a spawning river. Perhaps runoff pattern (discharge), temperature, and suspended sediment (turbidity) all influence their choice of river and their movement patterns. If so, recent proposed additional water releases from Fort

Lower left: Paddlefish with radio tag implanted through incision. The antenna (long wire) transmits a signal from a power supply the size of a D-cell battery inside the fish.

Lower right: Paddlefish with radio tag after sutures have been closed.



Dennis Scarnecchia



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Right

Peck Dam may affect paddlefish choice of river and spawning success, as well as the popular snag fisheries.

To clarify the relationships between annual river discharge, temperature, turbidity, and the paddlefish spawning migration, the North Dakota Game and Fish Department funded a telemetry study in the spring of 1999. The approach was to monitor the behavior of radio-tagged paddlefish as they approached and moved upriver of the Confluence. Data collected would help the Game and Fish

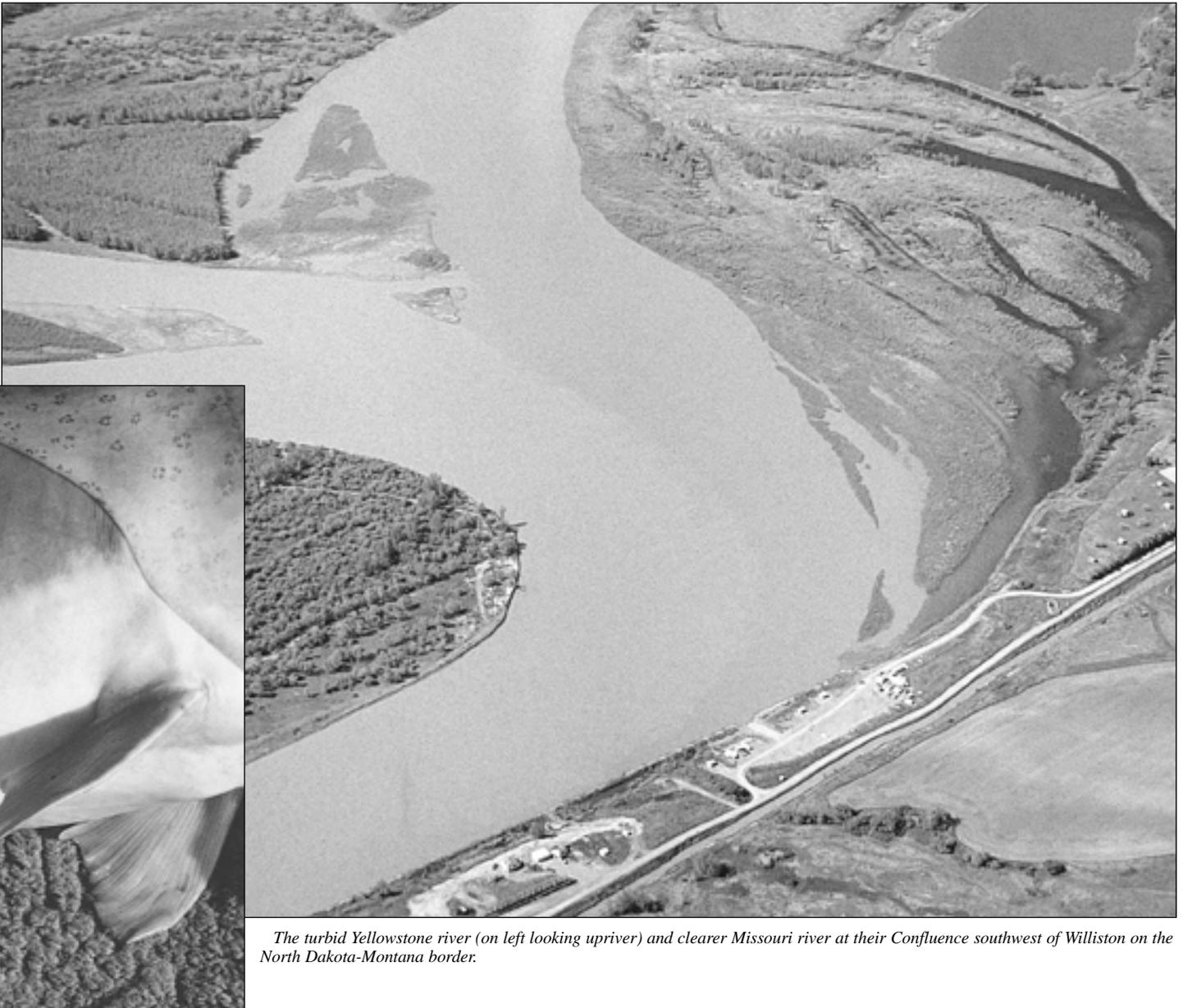
Department better manage the popular paddlefish fishery in the face of changing water regimes in both rivers.

During spring and fall of 1999, radio transmitters were surgically implanted into 47 adult paddlefish netted below the Confluence. Each radio tag transmits a unique frequency, much like a radio station, that will allow researchers to follow the fish for up to 6-10 years. Following a brief post-surgery recovery period, fish were released back into the river and allowed to continue their migrations. The movements of these fish were then tracked by boat, and occasionally by airplane. The implanted radio transmitters also make it possible to monitor paddlefish movements to find out more about their behavior year-round.

Results from 1999 clearly showed that radio-tagged paddlers much preferred the Yellowstone to the Missouri. Of 20 fish

successfully tracked, 18 showed a clear preference for the Yellowstone, which had the higher discharge of the two rivers; however, as Missouri River discharge temporarily increased from May 14-20, and as Yellowstone River discharge temporarily decreased over this same period, two fish were contacted up the Missouri River above the Confluence. Both fish, however, were contacted less than one week later up the Yellowstone River when the runoff pattern switched.

Similarly, during the 2000 spawning run, 8 of 12 tagged paddlefish moved only up the Yellowstone River as both discharge and turbidity increased. Four fish, however, were contacted up the Missouri River. Three of these fish moved above the Confluence during a period from April 28 through May 2. During that time the Missouri River discharge was increasing and the Yellowstone River discharge was



The turbid Yellowstone river (on left looking upriver) and clearer Missouri river at their Confluence southwest of Williston on the North Dakota-Montana border.

Fred Ryckman

decreasing. This was the only time the Missouri's turbidity was higher than in the Yellowstone. As in 1999, the increase in Missouri River discharge was short-lived, and three of the four fish that originally ascended the Missouri soon retreated to the Confluence and then ascended the Yellowstone.

Initial indications are that during both years, paddlefish at the Confluence were responding to rising discharge and turbidity when making their decision to turn left into the Yellowstone rather than right into the Missouri. Because water temperatures were consistently higher in the Yellowstone than in the Missouri, we have been unable to clarify its importance in influencing choice of river. The study has also provided useful information on migration rates and habitats used by migrating, pre-spawning paddlefish.

Results to date have provided Game and Fish Department managers with some indication of how paddlefish may respond if Fort Peck Reservoir water releases increase Missouri River discharge during the spring spawning run. A water release when Yellowstone River flows are relatively stable may trigger paddlefish movements up the Missouri rather than the Yellowstone. Paddlefish may not remain long in the Missouri, however, if the release only increases discharge for a short time. As seen in both years of the study, a temporary increase in Missouri discharge followed by a leveling off did not seem to provide the cues necessary to keep the tagged fish moving up the Missouri River. In contrast, a prolonged increase in discharge may retain paddlefish in the Missouri River for the entire spawning period. The influence this retention may have on reproductive success, however, is not known. The continued tracking of these tagged fish and others will clarify what fishery managers can expect with changing discharge patterns in the two rivers, and how the changes affect the migrations and spawning of the paddlefish and the unique fishery they provide.

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Tracking the radio-tagged paddlefish by boat on the Yellowstone River. The large Yagi antenna at left receives the signal from the transmitter inside the fish, and sends it to the receiver (metal box below antenna) for identification.



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One of several blind paddlefish (eyes grown over by skin tissue) caught during their upstream migrations in the Yellowstone river in the past decade. Adult paddlefish do not rely on visual cues for migration or spawning, and seem to feed and move quite well without eyesight.



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